

CLAIMS

What is claimed is:

1. A method of forming a structural panel, comprising:

5 using at least one metal sheet to form a frame structure, wherein
the frame panel defines an opening;

applying a generally transparent, fiber pre-impregnated resin tape
to the metal sheet to at least partially cover the metal sheet and fill the opening;

heating the metal sheet and the fiber pre-impregnated resin tape

10 such that the resin melts and at least partially covers the metal sheet and fills the
opening; and

wherein once cured, the generally transparent, fiber pre-
impregnated resin forms a see-through window portion in the frame panel.

15 2. The method of claim 1, wherein applying the generally
transparent, fiber pre-impregnated resin tape to the metal sheet comprises
applying a plurality of fiber pre-impregnated resin tapes one adjacent another to
fully cover the metal sheet and fully fill the opening therein.

20 3. The method of claim 1, wherein the fiber pre-impregnated
resin tape comprises a plurality of fibers impressed into a resin tape.

4. The method of claim 3, wherein the fibers are comprised of
fiberglass.

25 5. The method of claim 3, wherein the resin comprises an
transparent aliphatic epoxy resin.

30 6. The method of claim 3, wherein the fibers have an index of
refraction matching an index of refraction of the resin.

7. The method of claim 1, wherein the metal sheet comprises a
plurality of metal foil strips.

8. The method of claim 1, wherein the metal sheet comprises a solid metal sheet.

9. The method of claim 1, wherein the metal sheet is comprised
5 of aluminum.

10. The method of claim 1, wherein the metal sheet is comprised
of titanium.

10 11. The method of claim 1, wherein the metal sheet forms a plurality of openings each corresponding to a window.

12. The method of claim 1, wherein the fiber pre-impregnated resin tape has a width of approximately 1/8" (3.175 mm) to about 12" (304.8 mm).

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13. A method of manufacturing a transparent window skin panel comprising:

providing a tool;

5 providing a pre-impregnated resin tape comprised of a plurality of fibers impressed into a resin;

providing a structural sheet having a plurality of perforations formed therein;

layering the pre-impregnated resin tape and the structural sheet onto the tool such that the structural sheet and the pre-impregnated resin tape
10 are aligned one atop the other;

heating the tool, the structural sheet, and the pre-impregnated resin tape such that the resin flows to partially cover the metal sheet and the fibers, the resin and fibers being substantially transparent to form a see-through window portion in the skin panel.

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14. The method of claim 13, wherein the structural sheet comprises a metal sheet.

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15. The method of manufacturing a transparent window skin panel of claim 13, wherein providing a pre-impregnated resin tape, providing a metal sheet, and layering the pre-impregnated resin tape and the metal sheet onto the tool are repeated to produce a series of layers of variously alternating pre-impregnated resin tapes and metal sheets.

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16. The method of manufacturing a transparent window skin panel of claim 15, wherein the metal sheets each include at least one opening formed therein.

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17. The method of manufacturing a transparent window skin panel of claim 16, wherein applying the pre-impregnated resin tape within any given layer comprises applying a plurality of fiber pre-impregnated resin tapes one adjacent another to fully cover the metal sheets and fully fill the openings therein.

18. The method of manufacturing a transparent window skin panel of claim 13, wherein the fibers have an index of refraction matching an index of refraction of the resin.

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19. The method of manufacturing a transparent window skin panel of claim 13, wherein the resin comprises a transparent aliphatic epoxy.

10 20. The method of manufacturing a transparent window skin panel of claim 13, wherein the metal sheets are comprised of aluminum.

21. The method of manufacturing a transparent window skin panel of claim 13, wherein the metal sheets are comprised of titanium.

15 22. The method of manufacturing a transparent window skin panel of claim 13, wherein the fibers are comprised of fiberglass.

20 23. The method of manufacturing a transparent window skin panel of claim 13, wherein the resin comprises a transparent aliphatic epoxy resin.

24. The method of manufacturing a transparent window skin panel of claim 13, wherein the fibers have an index of refraction matching an index of refraction of the resin.

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25. The method of manufacturing a transparent window skin panel of claim 13, wherein the metal sheet comprises a plurality of metal foil strips.

30 26. The method of manufacturing a transparent window skin panel of claim 13, wherein the metal sheet comprises a solid metal sheet.

27. The method of manufacturing a transparent window skin panel of claim 13, wherein the metal sheet is comprised of aluminum.

28. The method of manufacturing a transparent window skin 5 panel of claim 13, wherein the metal sheet is comprised of titanium.

29. The method of manufacturing a transparent window skin panel of claim 13, wherein the pre-impregnated resin tape has a width of approximately 1/8" (3.175 mm) to about 12" (304.8 mm).

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30. The method of manufacturing a transparent window skin panel of claim 13, further comprising placing a caul plate atop the metal sheet, pre-impregnated resin tape, and tool.

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31. The method of manufacturing a transparent window skin panel of claim 30, further comprising placing the caul plate, metal sheet, pre-impregnated resin tape, and tool into a vacuum bag and removing the air therein.

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32. The method of manufacturing a transparent window skin panel of claim 13, wherein heating the tool, metal sheet, and pre-impregnated resin tape comprises using an autoclave.

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33. The method of manufacturing a transparent window skin panel of claim 29, wherein the autoclave heats the tool, metal sheet, and pre-impregnated resin tape to approximately 350 degrees Fahrenheit under approximately 100 to 200 psi of pressure.